MPLHR Overlap Correction Calibration (CALC)

I. Purpose:

The purpose of this procedure is to characterize the overlap of the detection and receiving optics of a high resolution MPL after installation at a site. The data file produced during this procedure is used to calibrate the near-range MPL behavior. The near-range behavior is very sensitive to the alignment of both the detection and receiving optics. The precise nature of this behavior may vary from instrument to instrument, and may change following transport of the instrument. It can be affected by either mechanical or thermal shock and may change subtly over time. Therefore, this procedure will need to be performed after installation at a site. It should be repeated following the replacement or realignment of any optical elements, or once per year in any event. **Note: this procedure is not yet normally performed during routine RESET visits.**

II. Cautions and Hazards:

- This procedure is to be performed only by RESET team personnel who have successfully completed a laser safety course.
- Care must be taken to protect the MPL transmitter/receiver assembly from mechanical shock.
- In addition, the optical fiber and electrical cables must not be kinked or subjected to strain or stress.

III. Requirements:

- The lidar needs to be positioned so that the laser beacon is within a few degrees of horizontal.
- The beam must be unobstructed for at least 10 km. Obstructions include buildings, trees, mountains, and low clouds.
- If possible, this measurement should be carried out at night.
- 7/16 inch wrench.
- A labjack with a cushion or pad of foam.
- Allen wrench, 9/64 inch (for high resolution HR).

IV. Procedure:

A. Steps:

1. Click on the RED “stop” icon on the right column bar to END win/MPL program. (Follow MPLHR Shutdown Procedure.)
2. Click on END MPL; next START; SHUTDOWN as winNT as usual.
3. If need to move entire MPL, TURN EVERYTHING **OFF** FIRST:
   - Computer:
     a) With handset, press mode (blank) button until WATTS is shown; press arrow DOWN until 0.00.
     b) Use key switch to turn OFF laser.
   - Use rocker to turn OFF MPL SCALAR.
   - Turn OFF illuminated rocker on main strip (at lease two people are necessary to disconnect Ethernet cable, power, mouse, and laser; carefully place telescope on rack and carry outside.

After Setting Up Outside

4. Turn ON in reverse order as turned OFF; click OK for service (wait one (1) minute before turning on laser power supply.

To Change Setting

NOTE: To turn l.c. ON MPL program, click on **start, programs, startup, and MPL2.exe.**

5. Click on first button (cloud w/ black border) on right of sever with mouse (sampling-take data without saving).
6. Click on End icon.
7. Click on Signal Scale (UP arrow to shrink down).
8. Click on file, then system setup; get configuration window.
9. Click on File, then System Setup; get configuration window.
10. Change averaging time to five (5) seconds; click OK or enter.
11. Change bin time to 2000.
12. Observe first screen and aim until no spikes are observed and angle is as close as possible to horizontal.
13. Click END.
14. Change acquisition time to one (1) min. by clicking on System Setup under File.

15. Click File, open for playback, go to parent directory (WMPL).
16. Click on Overlap folder.
17. With no files selected, click on OPEN.
18. Click on "X" box to close.
19. Click on cloud with blue border (sample and save).
20. Take data for at least one (1) hour.

Shut Down

21. Click on END icon.

Hard Target Test

22. Go to System Setup under File and reset to five (5) seconds (fast).
23. Click File, open file for playback, click on black cloud (do not save data).
24. Aim at close-in object after acquiring.
25. Repeat steps 7-13 above.
26. Put file in HARD TARGET file and sample.

Lid ON, Laser ON Test

27. Put lid ON laser.
28. Put file in Lid ON Laser ON and sample (steps 7-13).
29. Take data for two (2) minutes; end as in step 19.

Lid ON, Laser OFF Test

30. Power DOWN laser with handset to 0.00.
31. Put file in Lid ON Laser OFF and sample.
32. Take data for two (2) minutes; END.
33. Press "Cntrl Esc"; use "Windows Explorer" to copy files to disk.
34. Send to mentor.
35. Return MPL to original position by turning OFF, moving, and turning back ON (see above).

V. References:

1. Spinhirne, J.D., A.R. Rali and V.S. Scott, 1995: "compact Bye Safe Lidar Systems," Rev. of Laser Engineering (submitted) 6p.
2. Gaffney, J. MPL Instrument Manual, 1995—MAN(MPL)-xxx.xxx

VI. Attachments:

1. FM(MPL)-001, ARCS Micro Pulse Lidar Overlap Calibration Check Form
2. Example of Completed Form

Attachment 1: ARCS MPLHR Overlap Calibration Check Form FM(MPL)-001

ARCS Micro Pulse Lidar Overlap Calibration Check Form

I. Calibration information

This is a (check which):	Calibration	Calibration Check	Field Calibration
		X	

Date:	GMT Begin Time:	GMT End Time:	ARCS #

Instrument / System:	TWP OMS Part Number(s):	TWP OMS Serial Number(s):
High resolution MPL	MPL 1000	
Low resolution MPL	MPL 1000-009	

Location (eg. PNNL, ARCS1):	Participant(s):	Issued by:	Signature(s):

V. Completed Steps

Check the folowing steps when completed

Overlap Test	☐
Hard Target Test	☐
Lid ON, Laser ON	☐
Lid ON, Laser OFF	☐
Date Data Transferd to Mentor	

Document(s) Referenced:	Document(s) Updated:
PRO(MPL)-015.002	

SUMMARY OF RESULTS:

PROBLEMS:

NOTES:

Attachment 2: Example of Completed Form

ARCS Micro Pulse Lidar Overlap Calibration Check Form

I. Calibration information

This is a (check which):	Calibration	Calibration Check	Field Calibration
		X	

Date:	GMT Begin Time:	GMT End Time:	ARCS #
04/30/98	4:00	5:00	1

Instrument / System:	TWP OMS Part Number(s):	TWP OMS Serial Number(s):
High resolution MPL	MPL 1000	
Low resolution MPL	MPL 1000-009	NASA-141503 (Property #)

Location (eg. PNNL, Manus):	Participant(s):	Issued by:	Signature(s):
Manus	W.Porch	W. Porch	
	D. Scott		

V. Completed Steps

Check the folowing steps when completed

Overlap Test	x
Hard Target Test	
Lid ON, Laser ON	x
Lid ON, Laser OFF	x
Date Data Transfer to Mentor	4/30/98

Document(s) Referenced:	Document(s) Updated:
PRO(MPL)-015.002	

SUMMARY OF RESULTS:

PROBLEMS:

NOTES:

Data from this second overlap were put in file at PNNL to be transfered to C. Flynn.